

Automatic Microwave Configuration

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Work has been completed on the design and fabrication of hardware which provides computer access to the microwave subsystem configuration control group. Testing is nearly complete.

I. Introduction

A computer interface logic assembly has been developed as part of the automation effort which is being applied to the microwave configuration control equipment. The logic assembly provides computer access, through a DSN 14-line standard interface, to part of the configuration control equipment.

At the time of the last report (Ref. 1), the standard interface was being changed to include a priority structure. All of the changes have been completed, and the hardware has been tested at DSS 14. This article briefly describes the standard interface design and the test results.

II. Interface Design

One section of the logic assembly acts as a standard interface adapter. As indicated in Fig. 1, the adapter can be considered as a converter from 14 lines (12 bilateral and 2 unilateral) to 25 unilateral lines. The "response" and "ready" lines are transfer interlocks, and the two function

lines are used to establish transmission direction priority for opposing requests.

The standard interface adapter contains all of the logic necessary to correctly condition the interface to receive or transmit, as well as containing line drivers, receivers, line terminations, and noise rejection circuits.

The logic is synchronous, sequential, and uses clocked storage. Random logic functions are accomplished by two 256×4 (1024-bit) read-only memories. The use of memory reduces the package count by 20 and improves operation speed by eliminating buildup of gate delays.

III. Testing

Tests were conducted at DSS 14 during the recent cone change. The logic assembly was inserted into the cabling of the module II/III switch control panel. Using the 14-line interface test fixture (Ref. 1), position control and indication were verified for all of the RF switches in the tricone, modules II and III. No problems or failures were encountered in the logic assembly. All of the information

required for control and verification of correct operation was easily sent through the 14-line interface.

Noise margins within the logic assembly were checked after the equipment was connected to the long cables which run from the control room to the antenna. Unfortunately, the test was run at a time when the station was not operating, and the only noise observed on the cabling was a differential voltage of approximately 400 mV at 60 Hz and its harmonics. This noise did not feed through the output buffers into the logic assembly.

IV. Conclusion

Two tests are still required. One is a noise margin test in a station which is conducting tracking operations; the other is operation using a DSN computer instead of the standard interface test fixture. Even though the testing is not complete, enough has been done to provide confidence that there are no remaining problems associated with controlling or monitoring the position of switches within the microwave subsystem. When the two remaining tests are successfully completed, the design of the implementation prototype can begin.

Reference

1. Leflang, J. G., "Automation of Microwave Configuration Control," in *The Deep Space Network Progress Report 42-21*, pp. 59-64, Jet Propulsion Laboratory, Pasadena, California, June 15, 1974.

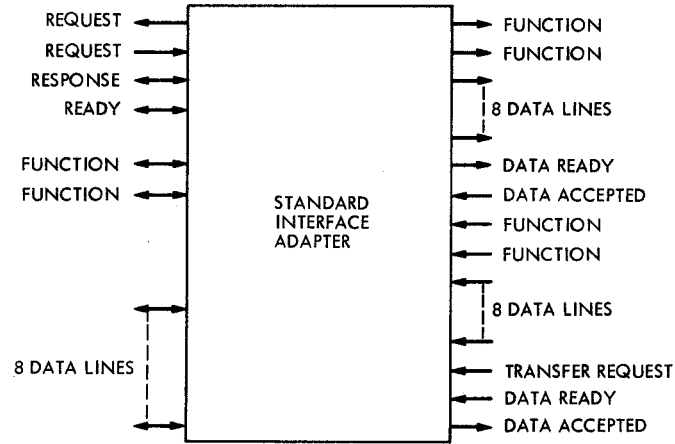


Fig. 1. Interfaces on the standard interface adapter